## [Course Overview](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505)

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[Hi everyone.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=0) [My name Manoj Ravikumar Nair.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=2.4274285714285715) [Welcome to my course, Azure Kubernetes Services - The Big Picture.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=8.496) [I work as a cloud solutions architect with Microsoft.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=11.821) [Whether you work for a startup,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=14.925) [working on the next Pokemon Go or for an enterprise](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=16.558285714285713) [modernizing your applications workloads,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=19.663) [containers are quickly becoming the preferred choice of](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=21.517) [computing for organizations worldwide.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=25.02633333333333) [While working with a couple of containers is absolute fun,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=26.781) [tens and thousands of containers can quickly spiral out of control.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=30.091) [Thankfully,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=35.025) [Kubernetes solves this problem and is quickly becoming the](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=35.397444444444446) [most sought after container orchestration service with](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=38.67175) [excellent community support.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=42.052571428571426) [This course is a quick introduction to Azure Kubernetes Service,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=43.925) [or AKS,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=47.295) [which is a managed Kubernetes service running on the](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=47.94754545454546) [enterprise-grade cloud offering powered Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=50.884) [No experience in Docker or Kubernetes is required.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=54.664) [Some of the major topics that we will cover include examining](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=58.767) [the use case for Kubernetes; understanding the fundamentals of](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=61.808923076923115) [Docker and Kubernetes; exploring the container ecosystem on](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=65.53650000000002) [Microsoft Azure; deploying, and scaling,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=69.52414285714289) [and updating applications on the Azure Kubernetes Service.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=71.95636363636362) [By the end of this course,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=75.64) [you'll have a solid understanding of the fundamentals of the Azure Kubernetes](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=76.7273846153846) [Service and be ready to make an informed choice on how AKS would fit into your](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=79.60516666666665) [containerization or your modernization strategy.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=85.38190909090906) [From here,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=87.41166666666668) [continue your learning by diving into Azure Container Services](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=88.24277777777779) [with courses on Azure Container Instances and Designing a](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=91.946) [Compute Strategy for Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=95.02759999999998) [I hope you'll join me in this journey to learn Azure Kubernetes Service,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=96.68633333333332) [or AKS, with the Azure Kubernetes Services - The Big Picture course here,](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=101.11445454545455) [at Pluralsight. On that note, let's get kubing.](https://app.pluralsight.com/course-player?clipId=729be862-1ebb-421e-ac80-c09cb45e5505&startTime=105.98811111111112)

## [What Is Azure Kubernetes Service (AKS)?](https://app.pluralsight.com/course-player?clipId=7d27c37e-9b8d-4186-9b6e-54b4e03dd772)

### [Version Check](https://app.pluralsight.com/course-player?clipId=7d27c37e-9b8d-4186-9b6e-54b4e03dd772)

### [Module Introduction](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2)

[Unless you've been living under a rock,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=1.74) [you might have heard about containers or, if I have to be](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=3.18) [vendor‑specific, Docker containers are the CoreOS's rkt.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=5.96) [If not, you're certainly making this guy angry, in fact very angry.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=11.74) [All right, I'm joking.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=16.84) [But containers are indeed one of the most sought‑after](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=18.44) [technologies in today's computing world.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=21.06) [Whether you work for an enterprise that is adopting containers to](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=23.54) [modernize your application stack or you're a part of this awesome](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=26.24) [startup that is working on the next Pokemon Go,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=29.97) [containers are becoming the de facto compute](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=32.64) [service for organizations worldwide.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=34.77) [And for Kubernetes, well,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=37.22) [Kubernetes has become the preferred choice for container orchestration.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=39.68) [Hold on a second.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=44.04) [It's just a minute in this course,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=45.24) [and I have already thrown a bunch of buzz words.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=46.47) [Before you think about closing your browser window and thinking](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=50.34) [that this is going to be a keyword heavy course,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=52.97) [bear with me for a moment.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=54.87) [Well, as with every big picture course, to get the most out of this,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=57.54) [you and I must be on the same page.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=61.07) [You may or may not have heard about Kubernetes or all this Docker hype.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=63.74) [That's okay.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=67.94) [This course will cement the core concepts of Kubernetes and its](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=69.44) [orchestration magic and top it up with the Microsoft Azure's magic](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=72.78) [serum of AKS or the Azure Kubernetes Service.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=77.49) [So in this module, my intention is to set the field straight.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=82.24) [We will demystify a lot of terms, terms like containers,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=86.54) [container orchestration via Kubernetes, microservices,](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=89.45) [and a whole lot more.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=92.44) [Once we are on the same page in terms of Docker](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=94.53) [containers and what Kubernetes is, we will dig into the meat of this course.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=97.61) [What is this Azure Kubernetes Service or AKS? There are plenty of cloud](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=102.34) [vendors out there that offer a managed Kubernetes offering.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=107.51) [So why choose Microsoft Azure?](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=110.74) [Well, that's a great question, and I'll cover that off in this module.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=114.24) [I am so excited to take you on a journey with Azure Kubernetes Service, so let's get started.](https://app.pluralsight.com/course-player?clipId=fdf52019-ee43-4b23-a9f9-a63ab74279c2&startTime=119.34)

### [The Case for Kubernetes](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963)

[Traditionally, software applications were built as big monoliths,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=2.54) [running either as a single process or a small number of](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=6.29) [processes spread across a handful of servers.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=9.73) [At the end of every release cycle,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=13.34) [developers had to package the whole system and hand it over to the ITOps team,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=15.49) [which then deploys it and monitors its health.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=19.85) [In case of any hardware failures,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=22.33) [the ITOps team manually migrates it to remaining healthy servers.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=24.72) [Fast‑forward 2018,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=28.02) [these big monolithic legacy applications are being](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=30.87) [broken down into much smaller,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=33.89) [independently running components called microservices.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=36.22) [Microservices are decoupled from each other,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=39.94) [and therefore, they can be developed, deployed,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=42.55) [updated, and scaled individually.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=44.78) [By adopting the microservices architectural pattern,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=47) [you can change components quickly and quite often as you need to keep up](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=50.37) [with today's rapidly changing business requirements.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=54.88) [Each microservice exposes its functionality or services via an interface,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=58.14) [typically a RESTful API.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=62.65) [This allows other microservices to consume those APIs](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=65.04) [using any language of their choice.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=68.51) [Because each microservice is a standalone process with](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=71.34) [a relatively static external API,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=74.83) [it is possible to develop and deploy each microservice separately.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=77.84) [A change to one of them doesn't require changes or redeployment of](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=82.04) [any other microservice provided that the API doesn't change, or](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=85.67) [change is only in a backward‑compatible way.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=89.98) [Let me explain this with the help of an example.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=93.34) [Let's say you build a web application that accepts an image](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=95.61) [and performs a few image manipulation tasks,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=98.54) [like converting into a grayscale image, applying brightness,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=101.34) [applying contrast, etc.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=104.69) [Also, all this functionality is currently built into a single code base.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=107.04) [You package this code, and you deploy it on a server.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=111.74) [The application becomes famous.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=114.61) [So to keep up with demand, you either scale vertically,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=116.83) [that is you add more CPU, RAM, and make the server beefy.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=120.24) [Or you can scale horizontally and add more servers that contain the](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=123.79) [code base and place a load balancer in front of them.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=128.25) [Now,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=131.24) [let's say that the most popular feature of this application](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=132.04) [turns out to be the grayscaling of the images.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=134.98) [Since all this functionality is tightly coupled into a single code base,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=138.14) [you can no longer scale just this feature of grayscaling images.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=142.14) [Now let's say you decompose your application into multiple services,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=145.74) [each developed independently and exposes its functionality as an API.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=149.05) [So let's say you have a web front‑end server that accepts](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=153.94) [the image and stores into a cloud storage service like the](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=156.63) [Microsoft Azure storage hub.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=159.98) [Then, based on the request,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=162.24) [you either call the grayscale service or the apply](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=163.84) [brightness service or the apply contrast service.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=166.67) [If in future, you notice that a particular feature gets more popular,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=170.34) [you can simply deploy more instances of that feature.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=173.97) [And boom, you already have easily scaled one specific aspect of your application.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=176.5) [Also,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=182.54) [the development team working on these features can work](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=183.21) [independently and build the servers with the technology best](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=185.78) [suited for their implementation.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=189.04) [Awesome, isn't it?](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=190.74) [But like anything in the software world,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=193.24) [microservices solves and addresses a lot of problems that monoliths faced,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=195.06) [but also introduces a fresh set of challenges.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=199.42) [When your system consists of only a small number of deployable components,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=203.74) [managing these components is very easy.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=207.68) [It's trivial to decide where to deploy each component](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=210.64) [because there aren't much choices.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=213.17) [For example, if my application is contained in a single code base,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=215.64) [I can simply deploy this code base to multiple servers](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=219.94) [and potentially load balance them.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=223.07) [When the number of these components increases,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=225.74) [deployment‑ready decisions become increasingly difficult because not only](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=228.28) [does the number of deployment combinations increase,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=232.28) [but the number of interdependencies between these](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=235.34) [components increases by even a greater factor.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=237.92) [It's much harder to figure out where to put each of these](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=241.24) [components to achieve high resource utilization and thereby](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=243.95) [to keep the hardware costs down.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=247.64) [Doing all of this manually is a hard work.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=250.24) [For instance, let's say in the earlier example,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=253.84) [if the apply brightness service requires a GPU to work,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=256.41) [you need to make sure that you deploy this](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=260.04) [microservice on a host that has a GPU.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=262.25) [We need automation,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=265.84) [which includes the automatic scheduling of those components to our servers,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=266.73) [automatic configuration, supervision, and failure handling.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=270.79) [In other words, if you're going to host microservices in containers,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=275.04) [you need something that orchestrates this for you.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=279.15) [You need a container orchestrator, and this is where Kubernetes comes in.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=282.04) [Kubernetes enables developers to deploy their applications themselves as](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=287.24) [often as they want without requiring any assistance from the ITOps team. But](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=291.45) [Kubernetes doesn't just benefit the developers.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=297.38) [It also helps the ops team by automatically monitoring and rescheduling](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=300.34) [those apps in the event of a hardware failure. The focus for sysadmins](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=303.88) [shift from supervising the individual applications to mostly supervising](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=308.32) [and managing Kubernetes and the rest of the infrastructure, while](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=312.59) [Kubernetes itself takes care of the applications. And here's my favorite](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=315.73) [feature of Kubernetes.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=320.06) [Kubernetes abstracts away the hardware infrastructure and exposes your whole](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=321.64) [data center as a single gigantic computational resource.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=325.68) [It allows you to deploy and run your software components without](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=329.84) [having to know about the actual servers underneath.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=332.83) [It doesn't care whether the server is a physical box or a virtual machine.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=335.84) [When you deploy a multi‑component application through Kubernetes,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=339.94) [it selects a server for each component,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=343.42) [deploys it, and enables it to easily find and communicate with](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=345.76) [all the other components of your application.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=349.6) [This makes Kubernetes great for most of the on‑premises data centers. But](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=352.34) [where it starts to shine and is almost godsend is that when it's used in](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=357.28) [one of the world's largest data centers,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=361.45) [the ones that are run by Microsoft. With the enterprise‑grade cloud](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=363.98) [offered by Microsoft and the scale of features it provides, Kubernetes](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=368.26) [plus Microsoft Azure is a win‑win situation for both developers, as well](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=372.1) [as ITOps. And as a technical decision maker,](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=376.24) [you know that if your developers and ITOps team are happy at the same time, productivity increases, and your business goals can be successfully met.](https://app.pluralsight.com/course-player?clipId=c0360cf9-09eb-4c1b-9784-91c4a5be0963&startTime=379.21)

### [Containers 101](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b)

[If you point your browser to kubernetes.io,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=2.34) [you will notice this tagline on its homepage,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=4.94) [Production‑Grade Container Orchestration. Also,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=7.54) [note the one‑line definition,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=10.97) [so to speak. Kubernetes is an open‑source system for automating deployment,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=12.48) [scaling, and management of containerized applications.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=17.9) [So to better understand Kubernetes,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=22.34) [you must first have a good understanding of what containers are.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=25) [In simple words,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=29.24) [containers offer the lightweightness of a process and](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=30.34) [the isolation of an operating system.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=33.61) [Just like with virtual machines,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=36.84) [you can virtualize the hardware and have multiple virtual](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=38.51) [machines running on a single physical hardware box.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=41.45) [With containers,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=44.64) [you virtualize the operating system and get isolated copies of the operating](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=45.74) [system that can offer compute services to your applications.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=50.13) [Since the host operating system is already booted,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=54.64) [spinning up new containers is almost instantaneous.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=56.9) [Virtual machines run on virtualized hardware,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=61.04) [but they still contain a full‑blown operating system,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=63.35) [an operating system that needs to be patched,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=66.84) [upgraded, and maintained.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=68.75) [You then run your applications inside the virtual machine.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=71.04) [On the other hand,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=74.44) [containers running on a Linux operating system or with Windows Server](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=75.58) [2016 on Windows operating system use namespaces.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=79.15) [Namespaces offer isolation.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=83.64) [All system resources, such as file systems,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=87.04) [process IDs, user IDs, and network interfaces,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=89.59) [belong to a single namespace.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=93.64) [You can create additional namespaces and organize resources across them.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=96.24) [Now, here's the most important thing that I want you to remember.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=101.24) [The process will only see resources that are inside the same namespace.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=105.14) [Now, multiple kinds of namespaces exist.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=109.74) [So a process doesn't belong to one namespace, but to one namespace of each kind.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=112.82) [There are multiple kinds of namespaces, like mount, process ID,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=119.44) [network, inter‑process communication, UTS,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=124.64) [and user ID.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=128.44) [Each namespace kind is used to isolate a certain group of resources.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=130.64) [For example,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=135.24) [the UTS namespace determines what host name and domain name the](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=136.16) [process running inside the namespace sees.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=140.03) [But assigning two different UTS namespaces to a pair of processes,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=142.63) [you can make them see different local host names.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=146.76) [In other words, to the two processes,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=149.74) [it will appear as though they are running on two different machines,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=152.03) [at least as far as the host name is concerned.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=155.44) [Likewise,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=158.04) [what network namespace a process belongs to determines which network](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=159.14) [interfaces the application running inside the process sees.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=162.7) [Each network interface belongs to exactly one namespace,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=166.84) [but can be moved from one namespace to other.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=170.74) [Each container uses its own network namespace.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=174.14) [And therefore, each container sees only its own set of network interfaces.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=177.01) [What I've covered so far should give you a basic idea of how](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=183.04) [namespaces are used to isolate applications running inside](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=186.31) [the container from each other.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=189.95) [The other half of container isolation deals with limiting the](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=192.14) [amount of system resources a container can consume.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=195.84) [This is achieved with Cgroups,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=199.54) [a Linux kernel feature that limits the resource usage of](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=201.23) [a process or a group of processes.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=204.34) [A process can't use more than the configured amount of CPU,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=206.64) [memory, and network bandwidth.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=209.53) [This way, processes cannot hog resources reserved for other processes,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=211.23) [which is very similar when each process runs on a separate machine.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=216.44) [While container technologies have been around for a long time,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=220.74) [they have become more widely known with the rise of Docker container platform.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=224.74) [Docker was the first container system that made containers](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=229.54) [easily portable across different machines.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=232.55) [It simplified the process of packaging up not only the application,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=235.74) [but also all its libraries and other dependencies,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=239.37) [even the whole OS file system,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=242.54) [into a simple portable package that can be used to provision the](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=244.54) [application to any other machine running Docker.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=248.59) [When you run an application package with Docker,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=252.94) [it sees the exact file system contents that you have bundled with it.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=255.46) [It sees the same files whether it's running on your](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=259.94) [development machine or on a production machine,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=262.1) [even if the production server is running a completely](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=264.78) [different Linux operating system.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=267.35) [The application won't see anything from the server it's running on.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=269.36) [So it doesn't matter if the server has a completely different set of](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=273.34) [installed libraries compared to your development machine.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=276.74) [For example,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=279.94) [if you package your application with the files of](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=280.81) [the whole Ubuntu operating system,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=283.01) [the application will believe that it's running inside Ubuntu.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=285.34) [But when you run it on your development machine that runs](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=288.54) [CentOS or when you run it on a server running Red Hat or](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=291.25) [some other Linux distribution, only the kernel may be different.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=294.78) [This is similar to creating a virtual machine image by](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=299.14) [installing an operating system inside a VM,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=301.66) [installing the app inside it,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=304.14) [and then distributing the whole VM image around and running it.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=305.61) [Docker achieves the same effect.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=310.04) [But instead of using VMs to achieve application isolation,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=311.84) [it uses Linux containers technologies like namespaces and](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=315.3) [control groups to provide almost the same level of](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=318.26) [isolation that virtual machines do.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=321.1) [So instead of using big monolithic VM images,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=324.08) [it uses container images, which are usually much,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=327.83) [much smaller.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=330.72) [So what does Docker offer?](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=332.54) [Well, Docker is a platform for packaging,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=335.04) [distributing, and running applications.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=337.21) [There are three important concepts in Docker that](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=340.14) [you need to be aware of. Images.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=342.93) [A Docker‑based container image is essentially what you package](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=345.94) [your application and its environment into.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=348.86) [The image contains a file system and the path to the application](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=351.84) [executable when you run the image. Registries. A Docker registry is a](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=355.47) [repository that stores your Docker images and allows easy sharing of those](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=361.21) [images between different people and computers.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=365.62) [When you build your image,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=368.74) [you can either run it on the computer you have built it on,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=369.96) [or you can upload the image to a registry and put it on](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=373.01) [another computer and run it there.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=376.74) [And finally, containers.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=379.34) [A Docker‑based container is a regular Linux or a Windows container created from](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=381.44) [a Docker‑based container image. A running container is a process running on the](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=386.22) [host running Docker, but it's completely isolated from both the host, as well](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=391.14) [as the other processes running on it.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=396) [A typical Docker workflow for building and deploying](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=398.54) [applications is pretty straightforward.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=401.39) [The developer first builds an image and then pushes it to the registry.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=403.94) [The image is thus available to anyone who can access the registry.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=408.84) [They can pull the image to any machine of their choice](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=413.04) [running Docker and then run the image.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=416.04) [Docker creates an isolated container based on the image and runs the](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=419.04) [binary executable specified as a part of the image.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=422.92) [Well,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=427.24) [this is all that you need to know about containers to get](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=427.42) [the most out of this course. However,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=429.92) [feel free to look at other courses in the Pluralsight](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=432.34) [library to learn more about Docker. Now,](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=434.65) [the fact is that you're not going to work with just 1 or maybe](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=438.02) [10 containers in a production environment. There are going to](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=441.47) [be hundreds and thousands of them.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=444.7) [And we've already talked about how difficult it is to deploy and manage thousands of containers in the real world. Enter Kubernetes.](https://app.pluralsight.com/course-player?clipId=b29e35f6-3c81-4379-a485-1403f832d55b&startTime=447.74)

### [What Is Kubernetes](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6)

[Kubernetes is a software system that allows you to easily deploy and](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=1.84) [manage containerized applications on top of it.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=5.98) [It enables you to run your software applications on thousands of computer](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=9.44) [nodes as if all these nodes were a single anonymous computer.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=12.97) [It abstracts away the underlying infrastructure and doesn't care whether](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=18.04) [it contains physical machines or virtual machines.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=21.75) [When you deploy your applications through Kubernetes,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=25.74) [the process is always the same, whether your cluster contains](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=28.33) [only a couple of nodes or thousands of them.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=31.61) [The size of the cluster makes no difference at all.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=35.24) [Additional cluster nodes simply translate to additional amount of](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=38.34) [resources available to your deployed applications.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=41.59) [Here's the simplest possible view of a Kubernetes system.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=45.24) [The system is composed of a master node and any number of worker nodes.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=49.84) [The worker nodes were initially called as minions,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=55.24) [but now just referred as worker nodes.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=57.45) [It all starts with the developer.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=61.14) [Let me repeat that.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=64.14) [It all starts with the developer.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=65.18) [The developer submits the list of applications,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=68.04) [typically called an app descriptor, to the Kubernetes master.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=70.74) [The master looks at the app descriptor, figures out what to do,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=75.24) [and then deploys those applications onto the worker nodes.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=79.09) [As a developer, you don't care which node your application runs on.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=83.84) [Your only concern is that you want X amount of](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=88.24) [copies of your application running, and Kubernetes handles that for you.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=90.72) [The developer can specify that certain applications must run together,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=95.54) [and Kubernetes will deploy them on the same worker node.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=99.44) [Others will be spread around the cluster,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=102.61) [but they can still talk to each other in the same way,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=105.44) [regardless of where they are deployed.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=108.15) [Let's take a closer look at what a Kubernetes cluster is composed of. At the](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=111.14) [hardware level, a Kubernetes cluster is composed of many nodes,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=115.88) [which can be split into two types, the master node,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=120.03) [which hosts the Kubernetes control plane that controls and manages the whole](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=123.6) [Kubernetes system, worker nodes that run the actual applications that you](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=127.1) [deploy. The control plane, or the master node,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=131.69) [is what controls the cluster and makes it function.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=135.59) [It is what I call the heart and soul of Kubernetes.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=139.54) [It consists of multiple components that can run on a single](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=143.64) [master node or be split across multiple nodes and replicated](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=146.94) [to ensure high availability.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=151.13) [Let's take a look at these components one by one: the Kubernetes API server,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=154.14) [which you and the other control plane components](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=159.32) [communicate with, the scheduler, which schedules your applications,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=161.94) [basically assigning a worker node to each deployable component of your](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=166.42) [application, the controller manager, which performs the cluster‑level](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=170.04) [functions, such as replicating component,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=174.62) [keeping track of worker nodes,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=177.14) [handling node failures and so on, etcd, which is a reliable distributed data](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=179.12) [store that persistently stores the cluster configuration.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=184.48) [Note that these components of the control plane hold and control the state](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=188.94) [of the cluster, but they don't run your applications.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=191.86) [This is done by the workers nodes. The workers are the machines](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=195.34) [that run your containerized applications.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=199.26) [It consists of three important components, the container runtime, which can be](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=201.54) [Docker or rkt, the kubelet, which talks with the API server and manages](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=206.51) [containers on its node, and the Kubernetes service proxy,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=211.7) [which load balances network traffic between the application components.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=215.68) [All right, now that you have a good understanding](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=220.64) [of the Kubernetes architecture,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=222.9) [let's take a step back and try to understand how a developer or](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=224.84) [a DevOps engineer interacts with the Kubernetes cluster. To run](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=228.45) [an application in Kubernetes,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=232.7) [you first need to package it up into one or more containerized images,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=234.64) [push those images to an image repository, like an image registry like](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=239.34) [Docker Hub or Azure Container Registry, and then post a description of](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=243.23) [your application to the Kubernetes API server.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=247.16) [The description includes information such as the container image or images](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=250.64) [that contain your application components, how those components are related](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=254.15) [to each other, and which ones need to be run collocated. That is, they need](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=258.29) [to be run together on the same node.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=263.15) [For each component,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=266.44) [you can also specify how many copies or replicas you want to run. When the API](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=267.64) [server processes your application's description, the scheduler schedules](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=273.9) [specified groups of containers onto available worker nodes based on the](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=277.65) [computational resources required by each group and the unlocking of resources on](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=282.03) [each node at the moment. The kubelet on those nodes will then instruct the](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=286.96) [container runtime, which in this case is Docker, to pull the required container](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=292.01) [images and run the containers.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=296.24) [Now let's take a look at some of the benefits of using Kubernetes.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=300.04) [First,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=304.74) [it simplifies application deployment. By exposing your worker nodes](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=305.19) [as a single deployment platform, it abstracts developers from the](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=309.68) [underlying infrastructure, making deploying applications easy as a](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=313.67) [pie. Better hardware utilization.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=317.59) [While you can certainly manually choose the node you want to deploy](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=321.34) [your containerized applications onto, outsourcing that to](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=324.38) [Kubernetes is a much more intelligent choice.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=327.72) [Kubernetes chooses the most appropriate node to run your application based on](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=330.64) [the description of the application's resource requirements and the available](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=334.82) [resources on each node. Health monitoring and self‑healing. In the unfortunate](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=338.26) [event that a worker node dies or becomes inaccessible, Kubernetes will select](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=344.68) [the new nodes for all the containers that were running on the node and run](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=349.23) [them on the newly selected nodes. Automatic scaling. While the application is](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=352.91) [running,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=358.7) [you can decide whether you want to increase or decrease the](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=359.12) [number of copies, and Kubernetes will spin up additional ones](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=361.74) [or simply stop the excess ones.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=365.08) [You can even leave the job of deciding the optimal](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=368.14) [number of copies to Kubernetes.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=370.65) [Now I'm pretty sure you're all excited to get your hands dirty](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=373.24) [with Kubernetes and see things in action.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=376.47) [But before that,](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=379.34) [we need to be very clear on Kubernetes objects or resources as they are also referred to as, and that's what I'm going to cover next.](https://app.pluralsight.com/course-player?clipId=e8771d98-b783-4881-84af-11fa654581c6&startTime=380.05)

### [Kubernetes Objects](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7)

[Let's start with kubectl.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=1.94) [Whether you pronounce it as kubectl or kube ctl,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=3.63) [well that's an internal debate within the Kubernetes Kubernetes.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=8.04) [For the purpose of this course, I'm going to pronounce it as kubectl.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=11.09) [Just like as you interact with Azure using the Azure CLI](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=15.18) [or using the Azure PowerShell module,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=18.92) [kubectl is a command line interface for running](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=21.64) [commands against Kubernetes clusters.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=24.19) [To run kubectl commands from your terminal window,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=26.51) [we use the syntax as shown on your screen,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=30.03) [kubectl followed by the command or the operation you want to perform,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=33.24) [then the type of the Kubernetes object that you want to work with,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=37.04) [which is then followed by the resource name and optionally any flags.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=40.24) [For example, to get the list of nodes running in your Kubernetes cluster,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=44.3) [you can run kubectl get nodes.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=48.95) [To learn more about kubectl, you can simply refer to the help documentation.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=51.7) [For example, to get more help on kubectl,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=56.43) [you can type in kubectl and then type in help and then Enter.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=59.37) [Pods.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=64.94) [A Pod is the smallest unit that Kubernetes manages,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=66.53) [and it's a fundamental unit that the rest of the Kubernetes system is built on.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=69.97) [It is made of one or more containers and the](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=75.14) [information associated with those containers.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=77.77) [When you ask Kubernetes about a Pod,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=81.74) [it will return a data structure that includes a list of one or more](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=84.04) [containers along with the metadata that Kubernetes users to](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=86.97) [coordinate the Pod with other Pods and policies of how Kubernetes](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=90.37) [should act and react if the program fails.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=94.49) [The metadata can also define things such as affinity,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=99.54) [which influences where a Pod should be scheduled in a cluster,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=102.14) [expectations around how to get the container images,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=105.64) [and much more.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=107.97) [Now one thing to bear in mind is that the Pod is not intended to](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=110.14) [be treated as a durable or a long‑lived entity.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=113.15) [Here are some of the characteristics of a Kubernetes Pod.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=117.34) [All the containers for a Pod will be run on the same node.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=121.64) [Any container running within a Pod will share the node's](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=125.64) [network and any other containers in the same Pod.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=128.19) [Containers within a Pod can share files through](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=131.64) [volumes attached to the containers.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=134.56) [A Pod has an explicit lifecycle and will always remain](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=136.7) [on the node in which it was started.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=141.15) [For all practical purposes,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=144.01) [when you want to know what's running on a Kubernetes cluster,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=147) [you are generally going to want to know about the Pods running](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=151.04) [with your Kubernetes cluster and their state.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=153.64) [Let's tackle namespaces now.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=157.04) [Pods are collected into namespaces,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=159.54) [which are used to group Pods together for a variety of purposes.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=161.44) [For example, to see the status of all the Pods in the cluster,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=165.84) [you can run kubectl get pods with the ‑‑all ‑namespaces option.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=169.38) [Namespaces can be used to provide quotas and limits around the resource usage,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=175.63) [have an impact on the DNS names that Kubernetes creates internal to the cluster,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=180.74) [and, in future, may even impact access control policies.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=185.26) [If no namespace is specified when interacting with](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=190.54) [the Kubernetes through kubectl,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=193.22) [the command assumes that you're working with the default namespace,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=195.15) [which is typically called default.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=199.05) [Note,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=201.36) [a node is a machine typically running Linux that has](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=203.54) [been added to the Kubernetes cluster.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=205.95) [It can be a physical machine or a virtual machine.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=208.44) [As we saw earlier, the master node is the brain of Kubernetes,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=211.6) [while the worker nodes do the actual work pulling](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=215.72) [container images and running Pods.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=217.81) [Networks.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=220.34) [All the containers in a Pod share the nodes network.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=222.94) [In addition,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=226.54) [all nodes in a Kubernetes cluster are expected to be connected to](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=227.09) [each other and share a private cluster‑wide network.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=230.7) [When Kubernetes runs containers in a Pod,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=235.74) [it does so within this isolated network.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=238.24) [Kubernetes is also responsible for handling IP addresses,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=240.94) [creating DNS entries,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=245.11) [and making sure that a Pod can communicate with the other](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=246.62) [Pod in the same Kubernetes cluster.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=249.98) [Services, which we'll dig into a bit later,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=252.92) [is what Kubernetes uses to expose Pods to each other over this private](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=256.33) [network or to handle connections in and out of the cluster.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=261.18) [Controllers.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=264.86) [Kubernetes is built with the notion that you tell it what you want,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=266.84) [and it knows how to do it, just like PowerShell's desired state configuration.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=270.15) [When you interact with Kubernetes,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=275.64) [you're asserting you want one or more resources to be in a](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=277.3) [certain state and with specific version.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=280.3) [Controllers are where the brains exist for tracking those resources](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=283.47) [and attempt to run your software as you describe.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=287.81) [These descriptions can include how many copies of a container image are running,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=292.14) [updating the software version running within a Pod,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=296.84) [and handing the case of a node failure where you](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=299.43) [unexpectedly lose a part of your cluster.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=302.49) [There are a variety of controllers used within Kubernetes,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=305.74) [and they are mostly hidden behind two key resources,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=308.33) [deployments and replica sets.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=312.04) [Let's first start with replica sets.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=314.84) [A ReplicaSet is associated with a Pod and indicates how many instances](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=317.14) [of that Pod should be running within that cluster.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=321.56) [A ReplicaSet also implies that Kubernetes has a controller that watches the](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=325.24) [ongoing state and knows how many of your Pods to keep running.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=329.35) [This is where Kubernetes is really starting to do the work for you.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=333.94) [If you specify three Pods in a ReplicaSet and one failed,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=337.84) [Kubernetes will automatically schedule and run another Pod for you.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=341.84) [A ReplicaSet is commonly wrapped in turn by a deployment.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=346.14) [Now let's talk a little bit more about deployments.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=350.24) [The most common and recommended way to run code on](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=353.44) [Kubernetes is with the deployment, which is managed by a deployment controller.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=356.2) [A Pod by itself is interesting, but limited,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=361.01) [specifically because it is intended to be ephemeral.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=365.2) [If a node were to die, all the Pods on the node would stop running.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=368.84) [ReplicaSets provides self‑healing capabilities.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=373.15) [Self‑healing, hmm.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=378.04) [What does that mean?](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=378.9) [Well,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=380.57) [ReplicaSets work within the cluster to recognize when a Pod is no](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=380.82) [longer available and which will attempt to schedule another Pod](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=384.22) [typically to bring a service back online.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=387.99) [The deployment controller wraps around an extensive ReplicaSet controller,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=391.04) [and it is primarily responsible for rolling out software updates and](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=394.99) [managing processes of that rollout when you update your deployment](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=399.54) [resource with new versions of your software.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=402.88) [The deployment controller includes metadata settings to know how many](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=406.24) [Pods to keep running so that you can enable a seamless rolling update](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=409.58) [of your software by adding new versions of a container and stopping all](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=413.41) [versions when you request it.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=417.18) [Services.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=419.44) [A service is the Kubernetes resource used to provision and](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=420.22) [abstraction through to your Pods that is agnostic of the](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=423.92) [specific instances that are running.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=427.37) [Providing a layer between what one container or a set of containers provides,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=429.84) [such as a front‑end web application and other layers such as a database,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=434.7) [it allows Kubernetes to scale them independently,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=438.74) [update them, handle scaling issues, and much more.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=441.59) [A service can also contain a policy by which data should be transferred.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=445.54) [So you might consider a service as a software load balancer within Kubernetes.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=449) [Finally, let's talk about representing Kubernetes resources.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=454.94) [Kubernetes resources can be generally represented as](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=459.74) [either a JSON or a YAML structure.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=462.6) [Kubernetes is specifically built so that you can save this file.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=466.34) [And when you want to run your software,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=469.64) [you can use a command such as kubectl deploy and provide](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=471.48) [the definitions you created previously, and it uses that to run your software.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=474.91) [In the next module,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=479.61) [we'll use one such YAML file to deploy our application](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=481.31) [on a cluster managed by Kubernetes.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=484.26) [I think that's pretty much it.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=487.04) [Well, of course,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=488.64) [there are tons of other things that you can learn about Kubernetes.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=489.19) [But what we have covered so far,](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=492.34) [it should give you a pretty solid understanding of the fundamentals of Kubernetes.](https://app.pluralsight.com/course-player?clipId=9de648c1-45ff-40e3-b12f-bb64a0938ac7&startTime=494.45)

### [What Is AKS](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e)

[After watching the first few clips, you might be tempted to try out Kubernetes,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=2.04) [and I wouldn't blame you for that.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=5.72) [I felt the same when I started to read upon Kubernetes.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=7.66) [I just wanted to dive right in and get a Kube cluster up and running.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=10.84) [You can do this yourself and manually install Kubernetes master](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=15.54) [Node and a bunch of Kubernetes worker Nodes.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=18.66) [If you're deploying this in production,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=21.54) [then you also must take care of its high availability,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=23.29) [patching, maintaining,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=26.01) [adding more Nodes if your application requires more compute resources.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=27.35) [Doing the deployment of a Kubernetes cluster manually and](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=31.03) [then making sure that it's highly available,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=35.14) [well, that's a lot of work.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=37.43) [All we want is to take advantage of the amazing Kubernetes](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=40.14) [platform without going through the unnecessary underlying](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=43) [plumbing to get Kubernetes up and running.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=46.51) [Well, fortunately for us, we have Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=49.74) [Microsoft Azure offers Azure Kubernetes Service that simplifies deployment,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=53.58) [management, and operations of Kubernetes.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=58.34) [At the time of recording this course, Azure Kubernetes Service,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=60.58) [or AKS as it's generally referred to as,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=63.99) [is currently in public preview.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=66.43) [Though there is a very high chance by the time you're watching this course,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=68.7) [it will be generally available or GA.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=72.68) [Azure Kubernetes Service manages your hosted Kubernetes environment,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=75.22) [making it quick and very easy to deploy and manage containerized](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=79.12) [applications without any container orchestration expertise.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=82.99) [And here is the best part.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=87.54) [It elevates the burden of ongoing operations and maintenance by provisioning,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=88.9) [upgrading,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=93.9) [and scaling resources on demand without taking your applications offline.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=94.27) [In other words,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=98.82) [just like as Azure App Services abstracts you from the underlying](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=100.5) [virtual machines used to host your web or API apps,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=104.37) [AKS abstracts the complex infrastructure of a Kubernetes cluster using](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=107.72) [Azure virtual machines as Kubernetes worker Nodes,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=112.69) [Nodes that you don't have to babysit or take care of.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=116.04) [In fact,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=120.34) [so good is AKS that you don't even see or have to worry about the master Node.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=120.97) [That is completely managed by Azure.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=126.71) [Trust me.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=129.5) [This is indeed a winner because if you ever speak to a system](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=130.63) [administrator whose job is to maintain the high availability](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=134.93) [of the Kubernetes master Node,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=138.31) [he will cringe on how daunting that entire process can be.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=140.14) [By using AKS,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=144.64) [you can take advantage of the enterprise‑grade features of Microsoft Azure,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=146.4) [while still maintaining the application portability](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=150.35) [through Kubernetes and through Docker.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=152.87) [AKS reduces the complexity and operational overhead of managing a Kubernetes](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=155.54) [cluster by offloading much of the responsibility to Microsoft.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=160.45) [As a hosted Kubernetes service,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=164.05) [Azure handles the critical tasks such as health](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=166.64) [monitoring and maintenance for you.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=169.89) [In addition, you only pay for the agent Nodes within your clusters,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=172.54) [not for the masters.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=176.01) [Now how cool is that?](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=178.24) [The goal of Azure Kubernetes Service is to provide a container](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=180.54) [hosting environment by using open source tools and technologies](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=183.27) [that are popular among customers today.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=186.78) [With AKS,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=189.17) [you can use familiar tools like kubectl to manage and](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=190.41) [interact with your Kubernetes environment.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=194.1) [In fact, you don't even have to install kubectl.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=196.54) [If you use the Azure Cloud Shell, then kubectl is a part of that.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=199.46) [Let's take a look at the key benefits that Azure Kubernetes Service offers.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=205.34) [With AKS, you get automated Kubernetes version upgrades and patching.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=209.94) [So you don't have to worry about upgrading to a new](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=213.75) [version of Kubernetes once it's released.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=216.53) [Microsoft takes care of performing version upgrades and](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=219.24) [patching so that you can concentrate on your applications](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=222.21) [and not on the infrastructure.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=224.98) [Easy cluster scaling.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=227.34) [Do you want to scale your cluster from 1 to 10 worker Nodes?](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=229.04) [Well, that's easy as a pie with AKS.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=232.44) [You can use the Azure CLI or the SDKs to make a simple API call.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=235.24) [And boom, your cluster gets scaled.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=239.76) [Self‑healing hosted control plane or masters.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=242.39) [As I said earlier, you don't even see the master Nodes,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=246.84) [so one less thing to worry about.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=249.74) [Cost savings.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=251.82) [You only have to pay for the running agent pool Nodes.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=253.12) [If you're like me, I'm pretty sure you must be sold on Azure Kubernetes Service.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=257.44) [Now, you might wonder though,](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=262.54) [why should I use AKS when there are other vendors out there](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=264.68) [offering a manage Kubernetes platform?](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=268.61) [The answer to that question is very simple.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=271.14) [AKS is just one service within Microsoft Azure that offers container solutions.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=273.84) [There are others. Let's take a look at these next.](https://app.pluralsight.com/course-player?clipId=397048bc-8706-48ea-aa66-b60c5fca815e&startTime=279.04)

### [Beyond Management Kubernetes](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a)

[All right, Azure offers a managed Kubernetes platform.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=1.84) [Well, that's great. But why Azure?](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=5.64) [Why not someone else who offers a managed Kubernetes platform?](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=8.1) [We've already seen the benefits that AKS offers,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=12.54) [so I'm not going to hop on it again.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=15.44) [But when you evaluate a cloud vendor,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=18.24) [you typically look at the bigger picture or the wider](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=20.83) [ecosystem the cloud vendor brings onto the table.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=23.57) [Since we're talking about Azure and containers,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=26.94) [I will focus more on the container solutions on Azure.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=29.44) [Here is a quick overview of the Azure container ecosystem.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=33.34) [When you deploy container workloads on Azure's AKS or Azure Kubernetes Service,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=37.74) [you get the benefits of a managed Kubernetes platform plus the](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=42.84) [entire portfolio of Azure service offerings.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=46.61) [Let's start with Azure Container Instances.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=50.34) [So if you just want to deploy a container without worrying about](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=54.64) [the underlying host or about any orchestrator,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=57.71) [Azure Container Instance fits the bill.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=61.54) [With ACI,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=63.78) [you can easily start deploying containers to support your targeted use cases](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=64.8) [or other application development and testing scenarios.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=69.09) [So Dockerize your application and execute immediately with just one click.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=72.94) [For example, let's say you want a Jenkins server to run a few CI/CD tasks.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=77.99) [With ACI, you can spin up a Jenkins Docker container,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=83.16) [perform your builds, tests, etc., and then ted on ACI.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=86.67) [There are no virtual machines, no hypervisors to manage.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=91.24) [Here is one example.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=94.94) [I'm using the Azure CLI to create an ACI instance called mycontainer](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=96.54) [that uses the Microsoft ACI helloworld container image,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=101.46) [and I see that I want a public IP address.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=104.91) [As you can see, it spins up a container for me in 20 seconds or less.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=108.64) [And boom, I can now connect to the public IP address of my web application.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=113.38) [Of course, you can also do this via Azure portal.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=118.54) [When ACI was launched, it had a very interesting capability in it.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=121.39) [The ACI connector for Kubernetes,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=126.24) [which bridges the world of ACI with the world of Kubernetes.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=127.97) [The ACI connector can dispatch Pods to ACI.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=132.24) [So you get the benefits of the per‑second billing and the](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=135.07) [cloud‑scale container capabilities of ACI.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=137.73) [Think of this as your Kubernetes worker Nodes, but running on ACI.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=141.04) [This is all possible thanks to virtual kubelet.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=144.61) [The virutal kubelet registers itself as a Node and allows developers to program](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=148.1) [their own behaviors for operations on Pods and containers.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=153.26) [Next, Azure Container Registry.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=158.34) [For containers, we obviously need a storage layer to house our Docker images.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=160.63) [Well, that's where Azure Container Registry comes in.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=165.84) [Azure Container Registry, or ACR,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=169.44) [allows you to store images for all types of container deployments,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=171.75) [including DC/OS, Docker Swarm, Kubernetes,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=175.5) [and Azure services such as the App Service,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=178.49) [Batch, Service Fabric, and others.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=181.14) [Your DevOps team can manage the configuration of apps isolated from](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=184.24) [the configuration of the hosting environment.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=187.72) [You stop worrying about high availability.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=190.64) [You can efficiently manage a single registry,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=192.94) [which is replicated across multiple regions.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=195.32) [Now, thanks to georeplication,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=198.54) [you can manage global deployment as one entity to](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=200.02) [simplify operations and management.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=203.37) [You don't even have to learn new APIs or commands because ACR,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=205.8) [or Azure Container Registry,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=210.62) [is compatible with open‑source Docker Registry version 2 APIs.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=212.32) [So you can use the same open‑source Docker CLI tools you already are aware of.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=216.94) [You can get up and running with Azure Container](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=221.82) [Registry via portal in just a few clicks.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=224.95) [Let's talk about Service Fabric next.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=227.71) [Well, what can I say about Service Fabric?](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=231.54) [Service Fabric is the foundational technology](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=234.04) [powering core Azure infrastructure, as well as Microsoft services,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=236.58) [such as Skype for Business, Intune, Azure Event Hubs,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=240.25) [Azure Data Factory, Cosmos DB, SQL Database,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=244.84) [Dynamics 365, and Cortana.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=248.63) [It is designed to deliver highly available and durable services at cloud scale.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=252.34) [Service Fabric understands the available infrastructure and](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=258.24) [the resource needs of your application,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=261.66) [and it allows you to automatically enable scaling,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=263.58) [rolling upgrades, and self‑healing from faults when they occur.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=267.54) [Service Fabric is the Microsoft's container orchestration](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=272.24) [deploying microservices across a cluster of machines.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=275.45) [Microservices can be deployed in many ways.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=279.14) [Either you use the Service Fabric programming models,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=281.74) [ASP.NET Core, or deploying any core of your choice.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=284.64) [If you just want to deploy and manage containers, Service](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=288.74) [Fabric is a perfect choice for that as well.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=292.23) [It's a great container orchestrator.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=294.94) [Service Fabric runs everywhere.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=298.04) [You can create clusters of Service Fabric in your on‑premises environment,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=299.69) [in Azure, or in any other cloud vendor,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=303.78) [and you can use Windows servers or Linux for the underlying resources.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=306.87) [You can build both stateful and stateless microservices,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=311.74) [which is possible using Service Fabric.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=315.04) [A key differentiating factor with Service Fabric is its](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=318.34) [strong focus on building stateful services,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=321.6) [either with the built‑in programming models that it offers or](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=324.37) [by using containerized stateful services.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=328.18) [In the recent Build conference,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=330.91) [Microsoft also announced the new Service Fabric Mesh.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=333.18) [Now this is one thing I'm really excited about.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=336.74) [It's a service that offers the same reliability and mission](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=338.96) [control performance of Service Fabric,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=342.08) [but with no overhead of cluster management and patching operations.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=344.44) [Next, Azure App Services or Web App for Containers.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=350.34) [If you work with Azure,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=354.24) [you know that Azure App Service has been the industry](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=355.37) [leader for Platform as a Service offering for running of](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=357.74) [web applications or your API apps.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=360.3) [With Web App for Containers,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=363.15) [you get all the benefits of Azure App Service along with the](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=365.57) [ability to easily deploy and run containerized web](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=368.98) [applications that scale with your business.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=372.09) [You can also take advantage of the built‑in autoscaling and load balancing,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=375.34) [streamline continuous integration and continuous delivery with Docker Hub,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=379.44) [Azure Container Registry, and GitHub.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=383.15) [What this means is that the Azure App Service creates an](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=386.04) [association with the selected repository so your apps can be](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=388.82) [updated each time whenever your source code changes.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=392.47) [You can schedule performance and quality tests in staging environment](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=395.37) [and use deployment slots to swap staging to production in seconds or](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=399.94) [roll back previous versions without downtime.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=403.83) [And finally, the Azure Batch Service.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=406.15) [Azure Batch Service basically offers you cloud‑scale job scheduling](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=410.34) [and compute management that can scale to tens and hundreds and even](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=414.08) [thousands of virtual machines to power your high‑performance](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=417.78) [computing or the HPC workloads.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=420.79) [Azure Batch earlier used to run batch tasks only on Azure virtual machines.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=424.34) [However, now you can also use batch pool to run tasks in Docker containers.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=429.54) [Using containers provides an easy way to run batch tasks without the](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=436.14) [need to manage application packages and dependencies.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=439.89) [You can use both Windows and Linux containers.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=443.84) [And if you're excited about running your batch](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=446.49) [workloads on containers via Azure Batch,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=448.98) [be sure to check out the Shipyard toolkit at the link shown on your screen.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=451.84) [Batch Shipyard is a tool to help provision and execute](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=456.54) [containerized‑based batch processing and high‑performance](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=459.26) [compute workloads on Azure Batch compute pools.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=462.79) [As you saw,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=465.85) [Microsoft Azure offers a whole gamut of services that help you](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=467.35) [deploy and manage containerized workloads on Azure.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=470.97) [For a quick summary, let's take a look at this table.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=474.03) [If you want to simplify the deployment, management,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=477.74) [and operations of Kubernetes, well use Azure Kubernetes Service,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=479.8) [or AKS.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=483.78) [To easily run containers on Azure with a single command,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=485.23) [use Azure Container Instances.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=489.14) [To store and manage containerized images across all types of Azure deployments,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=491.33) [use Azure Container Registry.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=496.52) [For developing microservices and orchestrating containers on Windows and Linux,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=498.91) [use Service Fabric.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=503.97) [To deploy web applications on Linux using containers,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=505.66) [use Azure App Service or Web App for Containers.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=509.24) [And finally, to run repetitive compute jobs using containers, use Azure Batch.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=513.01) [Now you can also take advantage of other services like](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=518.24) [Cosmos DB that offers global scale, multi‑model database or,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=520.94) [my personal favorite, Azure Event Hubs or Azure Functions for going serverless,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=525.01) [and the list can just go on.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=529.69) [So when you use AKS,](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=531.94) [what you get is an access to a full suite of Azure services that can help you](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=533.27) [build an awesome application that you always wanted to build with the global scalability and performance offered by Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=ad043eee-3268-4e1f-8064-68f21848ce6a&startTime=537.98)

### [Module Summary](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45)

[Wow, we covered a lot in this module, isn't it?](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=1.84) [We looked at how organizations leveraging microservices architecture have a](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=4.94) [problem of managing these disparate services running in containers, and we](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=8.84) [needed a solution that can orchestrate the deployment,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=13.01) [the management, the failover, and the high availability of the container host.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=15.39) [Speaking of containers, we looked at the key benefits that containers offer,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=20.94) [the lightweight design of the process and the isolation of an operating system,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=25.04) [and a consistent and repeatable environment for both](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=28.88) [developers and system administrators.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=31.49) [We saw how Kubernetes abstracts the entire data center as a](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=34.74) [single computational resource and offers portable,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=38.27) [extensible,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=41.24) [open‑source platform for managing containerized workloads and services](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=41.87) [that facilitates both declarative configuration,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=46.34) [that is desired state, as well as automation.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=48.7) [While Kubernetes solves a lot of challenges with](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=52.44) [container management and orchestration, of course,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=54.45) [well, it does introduce one challenge though.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=57.44) [Who is going to deploy and manage Kubernetes?](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=59.54) [Well, thanks to Microsoft, Azure Kubernetes Service,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=62.04) [or AKS,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=65.36) [you get a managed Kubernetes platform that can be easily provisioned and](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=66.6) [scaled on demand, or you can also do that manually.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=69.91) [You get a self‑healed and a hosted control plane or the master Node,](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=73.04) [and you will only pay for the running worker Nodes.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=76.69) [And finally, we saw how Microsoft Azure offers a whole gamut of](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=80.34) [services to help you run your containerized workload.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=84.36) [Its rich ecosystem of services makes it the best place](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=87.94) [to deploy and run your application.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=91.77) [Remember, it's not just about an individual service. It's about](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=94.64) [utilizing the entire suit of services that Microsoft offers that](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=97.87) [can help you make the most out of Azure.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=101.71) [Now, I am pretty sure you must be itching to see AKS in action. So, see you in the next module where we will get our hands dirty with AKS.](https://app.pluralsight.com/course-player?clipId=01d9e8b9-0f15-40b5-b7a3-876ce0574f45&startTime=104.74)

## [AKS in Action](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d)

### [Module Introduction](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d)

[Now that we have a solid understanding of](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=3.24) [Kubernetes and Azure Kubernetes Service,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=5.14) [it's time for us to get our feet wet with AKS.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=8.04) [This module is full of demonstrations where we will walk through a typical](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=11.54) [workflow of deploying an application to an AKS cluster.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=15.76) [We will kick things off by reviewing the sample application](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=19.84) [we want to deploy to our AKS cluster,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=23.25) [verify a few prerequisites we need to have in place in](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=26.04) [order to test our sample application.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=28.99) [For the purpose of this course,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=31.32) [we'll be using an ASP.NET Core Razor Pages application](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=33.43) [that is built using the .NET SDK.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=36.44) [Let me emphasize.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=39.39) [It doesn't matter what platform or runtime you use.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=40.53) [It could be a Node application or a Ruby on Rails application.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=43.59) [As long as you Dockerize the application,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=47.84) [you should be good to follow along and deploy your](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=49.87) [application to an AKS cluster.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=52.43) [With your application image ready,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=54.83) [we will spin off a container based on this image and verify](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=56.94) [if our application is working as expected.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=60.37) [We will then deploy this application to an AKS cluster](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=62.81) [using the Kubernetes deployment object,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=66.35) [simulate a scaling event for our application,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=68.74) [as well as the worker Nodes,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=71.16) [update the application by deploying a new image of our application,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=73.14) [see how we can roll back changes made,](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=76.94) [and then, finally, wrap this modular by looking up at the](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=79.37) [declarative approach of deploying applications to a Kubernetes](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=82.5) [cluster. There's a lot to cover in this module, so grab your favorite beverage and let's get Kubing.](https://app.pluralsight.com/course-player?clipId=5d4e8c79-a39f-4708-ab09-efbc564a750d&startTime=86.17)

### [A Quick Tour of Your Development Environment](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50)

[I have installed the Docker Desktop for Windows and switched](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=2.04) [the configuration to use Linux containers.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=4.85) [If you're following along on a macOS, you can download Docker Desktop for Mac.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=7.64) [And on a Linux institution,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=11.65) [you can use the appropriate package manager to install Docker on your box.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=13.21) [Docker for desktop offers an easy way to set up a](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=18.14) [single‑node Kubernetes cluster.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=20.69) [All you need to do is to enable the checkbox to enable Kubernetes and hit Apply.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=23.04) [This will install the necessary components.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=28.26) [And once done,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=30.37) [you have a single‑node Kubernetes cluster available](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=31.75) [locally to deploy our applications into.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=34.29) [However, since we are focusing on Azure Kubernetes Service here,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=37.74) [you don't need to enable Kubernetes locally.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=41.73) [We will let Microsoft take care of that for us.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=44.74) [For the purpose of this course,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=47.42) [I have created a sample ASP.NET application based on the .NET 5 Docker image.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=49.05) [The code for the sample application, including the Dockerfile,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=54.5) [is available on my GitHub repository,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=57.62) [the link for which is up on your screen now.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=60.39) [If you review the code, you will notice that there are four branches,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=63.54) [version 1, version 2, version 3, and version 4,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=67.04) [each corresponding to the new version of the application.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=71.34) [You can very well clone the application and build a Docker](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=75.04) [image yourself using the docker build command.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=77.64) [However,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=80.64) [I have already created the images for the applications and their versions,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=81.38) [and they are available in my Docker Hub repository.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=84.86) [As you can see, there are four tags of this myapp Docker image,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=88.54) [each corresponding to the application version we just described.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=92.84) [Let's test our application by running a container](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=96.34) [based on the myapp Docker image.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=98.76) [I'll use the docker container run command.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=101.74) [Specify a name.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=104.4) [Let's say myapp.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=105.73) [Use the ‑d detach switch to run this app as a daemon or background process.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=106.9) [Specify that I want to map the port 8081 of my host](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=112.84) [machine to the port 80 of the container.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=116.98) [And finally, specify the name of the image,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=119.84) [which, in our case, is manojnair/myapp:v1.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=123.14) [This will pull down the necessary images from](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=126.66) [Docker Hub if not available locally.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=130.8) [And once done, run a container based on that image.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=133.64) [I can now connect to the port 8081 of my localhost.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=137.84) [And as you can see, it serves up my web application.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=141.66) [Pretty simple web application that displays the application version,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=144.84) [whether we are running this application in a container,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=148.74) [which we are right now, and shows the machine name,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=151.41) [which is the container name of our application.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=154.09) [Now to show you how this version, version v1,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=156.84) [differs from the other versions, I'll run the same command we used earlier,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=159.57) [but map port 8082 to version 2, 8083 to version 3,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=164.31) [8084 to version 4 of my application.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=169.88) [Awesome.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=173.75) [As you can see, I've created four versions of my application,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=176.04) [each running as a Docker container.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=179.26) [We will leverage these versions later in the module.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=182.44) [Now, of course,](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=186.24) [you're welcome to use these images or feel free to utilize](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=186.96) [your own Docker images if you wish to do so.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=190.03) [Now that we have all the prerequisites in place, let's go ahead and spin up a Kubernetes cluster in Microsoft Azure.](https://app.pluralsight.com/course-player?clipId=ea0d74a9-72fc-4a06-a4e8-f89fbda37b50&startTime=193.34)

### [Deploying an Azure Kubernetes Service AKS) Cluster](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9)

[Okay, this is the moment we have been waiting for.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=2.54) [It's time for us to sprinkle some AKS magic.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=5.57) [Let's create a resource, and under Categories,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=10.14) [I will choose Containers and then select the Kubernetes Service.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=12.31) [We will create a new resource group for our Kubernetes cluster.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=15.53) [Let's call it aks‑rg1, and let's call our cluster aksdemo1.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=18.75) [Choose the region as Central US.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=23.32) [Let's use the default version of Kubernetes,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=26.94) [which, at the time of recording this course,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=28.8) [is version 1.19.7.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=30.54) [Note that I'm using a DS2 v2 as the VM size for the Node.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=33.02) [This is actually a great choice if you need to take advantage of the](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=38.03) [enhanced networking capabilities that it offers,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=41.26) [especially when you want your Kubernetes deployments](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=44.24) [to talk to Azure services like, let's say,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=46.48) [Azure MySQL, for example.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=48.95) [Now for the Node count, we will set the Node count to 1.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=52.04) [This is intentional because later in the course,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=55.14) [we will scale the cluster Nodes to 2 using the Azure CLI.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=57.2) [Now, if you're doing this in production,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=61.94) [I highly recommend that you choose a value of 3 or higher.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=63.56) [Clicking on Next will launch the Node pools blade](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=67.25) [where we will stick to the default.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=70.07) [Next up is the Authentication blade,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=72.94) [and here is where you can go the old school route of](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=74.75) [either creating a service principal manually or using a](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=78.1) [system‑assigned managed identity.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=81.7) [I do want to point out that using a system‑assigned managed identity is a](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=84.94) [better choice as it alleviates the burden of renewing the service](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=88.92) [principal credentials to keep your cluster working.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=92.31) [If you're new to the concept of managed identities,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=95.94) [head over to my course Implementing Managed Identities in Microsoft Azure here,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=98.44) [at Pluralsight.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=103.19) [We will keep the RBAC enabled and choose the default](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=104.32) [encryption type and click on Next.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=108.2) [In the Networking blade under Network configuration,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=110.29) [we will choose Azure CNI,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=113.44) [which stands for the Azure Container Networking interface.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=115.39) [With Azure CNI, every Pod gets an IP address from the subnet,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=118.69) [which gives the Pod full virtual network connectivity.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=123.23) [The Pods can also be directly reached via their private](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=127.04) [IP addresses from connected networks.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=129.56) [For example, let's say you have a virtual machine in the same VNet.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=132.24) [It can access the Pod using the private IP address,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=135.22) [and this communication works both ways.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=138.05) [Since we don't have a VNet provisioned in my resource group, I'll create one.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=141.54) [Leave the IP address ranges at the defaults and](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=145.73) [provide a DNS prefix of aksdemo1.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=148.22) [Leaving the rest of the configuration as default,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=150.99) [we will move on to integrations Now,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=154.07) [we do want to use Azure Container Registry for our demos,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=157.74) [but I will not create it now.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=160.88) [We will create it later in the course.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=162.94) [Let's use the default workspace created for](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=165.14) [monitoring our cluster in Azure Monitor.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=167.35) [It's a good idea to tag your resources in production.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=170.14) [But here, I will just skip it and go to the review screen.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=172.99) [It will then run a final validation.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=176.64) [And once passed,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=178.3) [let's click on the Create button to kick off our cluster deployment.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=179.66) [This is going to take a few minutes, and once done,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=184.24) [we will have a single‑node Kubernetes cluster in Azure](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=186.43) [already for us to deploy our applications into.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=189.73) [To connect to our AKS cluster,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=193.14) [let's switch back to PowerShell and use the Azure CLI to get our cluster](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=194.72) [credentials. First, let me verify that I have logged into the right](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=199.02) [subscription by using the az account show command.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=203.78) [Now to set the default resource group for all subsequent Azure CLI commands,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=207.44) [I'll use the az configure command and send the defaults group to aks‑rg1.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=212.33) [With that set, let's run the az aks get credentials command and specify the](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=217.48) [name of our Kubernetes Custer, which is aksdemo1.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=223.58) [This will fetch the credentials and merge it into our current context so that](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=228.14) [we can repurpose the credentials for subsequent commands.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=232.46) [Pretty neat, I must admit.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=235.64) [Okay, now if you do not have kubectl installed,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=237.84) [you can simply run the az aks install‑cli command, and this](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=241.35) [will install the kubectl CLI on your machine.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=245.05) [I already have kubectl installed since I've enabled Kubernetes](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=248.04) [option in my Docker for desktop settings.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=251.38) [Okay, so to verify if we have the correct kubectl context,](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=254.54) [let's run the kubectl config current‑context command. And as you can](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=258.83) [see, it says aksdemo1. Let's quickly run the kubectl get nodes](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=262.67) [command and verify if we have a single worker Node available. Since](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=267.87) [we haven't deployed any applications yet, we neither have any](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=272.47) [developments nor any Pods.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=276.26) [So why don't we deploy some applications to this cluster in the next clip? See you there.](https://app.pluralsight.com/course-player?clipId=a29fa5c5-1c64-43c3-b190-0432944e25e9&startTime=278.54)

### [Deploying the Application to AKS Cluster Imperatively](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81)

[With our AKS cluster ready, let's now deploy our application to it.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=2.04) [Now, there are many ways to deploy an application to a Kubernetes cluster.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=6.24) [You can either use the imperative way,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=10.16) [which is basically firing a bunch of kubectl](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=12.31) [commands to create Kubernetes objects,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=14.7) [and it's a great way to test your applications,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=17.34) [especially in a development environment.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=19.22) [Alternatively,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=21.84) [you can use a declarative approach where we define our](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=22.86) [Kubernetes objects as YAML or JSON manifests,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=25.82) [and this is what is generally practice in most production scenarios.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=29.18) [I will show you an example of using a declarative approach later in this course.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=34.24) [As I want to keep the focus on AKS and get you up](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=39.14) [to speed as quickly as possible,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=42.43) [we'll be using the imperative way to create](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=44.58) [Kubernetes objects in most of the demos.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=47.19) [All right, so let's run our first application.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=50.24) [Our mission is to create a deployment that uses the image](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=53.94) [we have in my Docker Hub repository.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=57.1) [That is the manojnair/myapp:v1.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=59.08) [To do so, let's run the command kubectl create deployment.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=61.79) [We will specify the deployment name as myapp and the image as](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=68.04) [manojnair/myapp:v1 and the number of replicas as 1.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=72.03) [As you can see, a deployment is created.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=77.26) [Now to verify if a deployment was indeed successful,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=79.72) [let's run kubectl get deployment.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=83.56) [We see that we have a myapp deployment with 1 out of 1 Pods ready.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=86.94) [Let's also run kubectl get pods to see the Pod that is powering the deployment.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=92.54) [Awesome.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=97.03) [Now, we have our app deployed, but how do we connect to our application,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=98.24) [especially from outside of the Kubernetes cluster?](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=102.67) [Interesting question, isn't it?](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=105.54) [This is where we can take advantage of services in Kubernetes.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=107.64) [With AKS, when we create a service of type LoadBalancer,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=111.31) [it creates an Azure load balancer that will get a public IP,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=116.14) [and we can use the load balancer to connect to our application.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=119.74) [To create a service imperatively, we will use the kubectl expose command,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=123.74) [kubectl expose deployment.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=129.06) [Specify the name of the deployment, which,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=131.57) [in our case is myapp, and specify the type as LoadBalancer.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=133.87) [We will connect to port 80 of our service, which is our load](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=139.34) [balancer, to the port 80 of the container.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=142.13) [Now, before we run this command,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=145.14) [let's open a new PowerShell session. And to keep things a bit more interesting,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=147.27) [let's run kubectl get svc command with the ‑‑watch switch.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=151.97) [This will monitor the creation of the service and also](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=158.04) [watch for events as they unfold,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=161.05) [including creation of a new service and the assignment of the public IP.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=163.32) [All right,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=168.74) [so let me run the expose deployment command. And as you can see, the kubectl](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=169.14) [get service command shows our myapp service created. And after a while, it](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=173.6) [also shows the external IP it got assigned by Microsoft Azure. Great. Time](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=178.38) [to connect to our web application.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=184.37) [While in PowerShell, we can simply type the Start‑Process](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=186.74) [command and specify the URL of our application,](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=189.85) [which, in this case, is http followed by the external](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=192.98) [IP address of our load balancer.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=196.62) [This will launch the default browser, which, in my](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=199.54) [case, is Chrome, and there we go. We have our application up and running. Beautiful.](https://app.pluralsight.com/course-player?clipId=da3f2957-fe24-4fba-aa0f-dac06cbd1f81&startTime=201.7)

### [Scaling the Deployment Manually](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557)

[Let's run kubectl get deployments.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=2.44) [And as you can see, we have one deployment called myapp,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=4.65) [and it has one replica or a Pod.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=8.41) [Please note that we still have our service,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=12.14) [myapp,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=14.04) [that exposes the deployment using a load balancer To simulate a scaling event,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=14.4) [let's use kubectl scale command to scale our deployments to three replicas.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=19.89) [Okay, so kubectl scale deployment.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=24.74) [We'll specify the deployment name, which is myapp,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=27.59) [and then set the number of replicas to 3.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=30.89) [That's it.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=34.04) [Now, let's run kubectl get deployment, and as you can see,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=35.04) [we now have 3 replicas instead of 1.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=38.51) [If we now connect to our service's public IP address using a different tab or,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=41.84) [let's say, incognito windows,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=46.41) [you will see that our application is currently powered](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=48.44) [by three different Pods or replicas.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=50.75) [Let me show you something interesting.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=53.84) [Let's say we want to scale our application to use 100 Pods or replicas.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=56.14) [We run kubectl scale deployment myapp ‑‑replicas and set the value to 100.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=61.04) [Now, to monitor our scaling operation,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=67.94) [let's use the kubectl get deployments with the ‑‑watch switch.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=70.77) [You will notice that the number of Pods in our](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=76.84) [deployment is gradually increasing, and I'm going to give this some time.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=79.09) [And let us reach the steady state of 100 out of 100 Pods being available.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=83.33) [Hmm.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=92.94) [It is stuck at 99 out of 100.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=93.51) [Or, in other words, 99 Pods out of the desired 100 Pods are ready.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=96) [So the question that needs to be answered is why is the](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=101.34) [deployment stuck at 99 out of 100 Pods?](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=104.74) [Now, Pods run containers, and each container consumes vCPUs and memory.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=108.62) [So the obvious explanation to this mystery is that Kubernetes is trying](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=114.1) [its best to be bend back as many Pods as possible,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=117.62) [which in turn runs containers on the DS2 v2 Node that](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=120.92) [we have in our Kubernetes cluster.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=124.38) [There is one more important contributing factor.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=127.74) [Our Kubernetes cluster only has one Node of type DS2 v2,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=130.94) [and the maximum number of Pods it supports is 110.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=134.84) [Well, how did I get that number?](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=139.94) [Easy.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=141.69) [We can use the az aks nodepool show command and provide the cluster](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=142.58) [name and the pool name and query the maxPods property.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=146.91) [All right, so you might wonder, Manoj, we are just asking for 100 Pods.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=152.74) [Isn't that less than 110?](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=157.54) [So what's the problem here?](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=159.94) [That's a great question.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=161.84) [Let me explain.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=163.2) [Kubernetes uses some system Pods for its own operations.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=164.74) [You can see those Pods when you append the ‑‑namespace](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=168.44) [switch and use the kube‑system namespace.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=171.96) [Let me pipe this to Powershell's Measure command,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=174.94) [and now we can see that we have a count of 12.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=177.27) [Now this also includes the header, so there are technically 11 Pods.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=180.04) [So now if I run kubectl get pods,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=184.04) [but this time I'm going to append the ‑‑all namespaces switch,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=186.65) [I'll pipe this further to PowerShell's Measure command,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=191.24) [and now we get 112 ‑ 1, which is the header,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=193.85) [so technically 111 Pods.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=197.55) [So, Kubernetes is trying its best to bend back as many Pods as possible,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=201.04) [including the system ones,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=205.55) [that it needs to operate on the single worker Node that happens to be DS2 v2,](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=207.13) [and that has a maximum gap of 110 Pods.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=212.31) [So the question is how do I get 100 Pods for myapp deployment?](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=215.94) [Well, you guessed it right.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=220.64) [We need to add another worker Node to our cluster, which is what we will do next.](https://app.pluralsight.com/course-player?clipId=2d8a221a-7bd8-42e7-aa60-ccc13a51d557&startTime=222.14)

### [Scaling the Nodes Manually](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf)

[Everything in Azure translates to an API call.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=2.44) [This is true for Azure Kubernetes Service as well.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=5.84) [With just a single command,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=8.75) [you can scale the number of Nodes running in the AKS cluster.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=10.2) [Let's check the number of Nodes running in our AKS demo1](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=14.74) [cluster by using the command kubectl get nodes.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=17.95) [We currently only have one Node running, which happens to be a worker Node.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=21.31) [To scale the number of Nodes manually, we can run the command az aks scale,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=25.23) [specify the resource group and then the name of the cluster,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=31.34) [and, finally, the desired number of Nodes,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=35.44) [which, in our case, is going to be 2.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=37.59) [We will also add the ‑‑no‑wait switch so that we don't have to wait for this](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=40.64) [long running operation to complete before we get a prompt back.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=45.57) [To query the status of the operation,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=50) [we can use the command az aks nodepool show.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=52.42) [Specify the name of the Node pool, which,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=56.64) [in this case, is agentpool, and the cluster name which is aksdemo1,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=58.43) [the resource group, and, finally,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=63.34) [the query switch to query the Node count and the provisioning state.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=65.05) [This will take a few moments.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=70.34) [And once done,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=71.43) [we will have our AKS cluster scaled to a two‑Node cluster. We can easily](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=72.31) [verify this using the kubectl get nodes command. And as you can see, now](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=77.53) [we have two Nodes in our Kubernetes cluster.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=81.96) [Now that we have scaled our cluster,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=85.44) [let's actually go back and check the status of the](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=87.56) [deployment that we did in the last clip.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=90.06) [Remember, our deployment was stuck at 99 Pods as we maxed](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=93.14) [out on the number of Pods per Node.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=96.74) [Now that we have two Nodes,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=99.44) [we should be able to accommodate up to 222 Pods collectively.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=100.74) [So now, when we run kubectl get deployments,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=105.04) [you can see that our application,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=108.84) [myapp, has been successfully scaled to 100 Pods.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=110.77) [Pure awesomeness.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=114.34) [Let's scale it back to 3 replicas as we really don't need 100](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=116.54) [replicas for our application, kubectl scale deployment. We'll set](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=120.09) [the replicas count to 3. And finally,](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=124.34) [kubectl get deployments just to confirm that we have three Pods powering our deployment.](https://app.pluralsight.com/course-player?clipId=3c463383-ee3d-43ac-a4cf-4b929f722ebf&startTime=127.72)

### [Updating the Application](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb)

[If you recollect from our previous discussion,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=2.54) [we have four versions of our application,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=4.86) [v1, v2, v3, and v4.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=7.44) [Let's say we have a need to update the current version](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=10.12) [of our application to version 2.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=13.03) [Essentially, what we need to do is to update the image used by our deployment.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=15.34) [There are three ways to do so.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=20.34) [I'll show you a couple of options here in this clip and](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=22.14) [reserve the third option for a future clip.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=24.68) [Before we talk about updating our applications,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=27.94) [let me first draw your attention to rollout.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=30.14) [A rollout is used to manage the rollout of Kubernetes resources,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=33.64) [one of them being a deployment.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=37.62) [You need to instruct the Kubernetes API to record](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=39.77) [every change you make to the rollout,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=42.95) [and this is typically done by appending the ‑‑record switch,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=44.94) [which is set to true.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=48.78) [Let me show you the current rollout history of the myapp deployment.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=51.04) [You will run the kubectl rollout history command,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=56.34) [and we are tracking the deployment myapp.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=59.2) [Now let's capture this output, and we will come back to this later.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=61.73) [Let's start by describing a deployment using the](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=66.94) [kubectl describe deployment myapp.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=69.28) [Notice that in the Pod template, we're using the object myapp, and the image](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=72.2) [used by the myapp container is manojnair/myapp:v1. The first method of](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=77.49) [updating the image used by a deployment is to use the kubectl set image](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=85.49) [command. Let's add in kubectl set image deployment,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=90.56) [specify the myapp deployment, and we will set the myapp container's image](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=94.73) [to manojnair/myapp:v2. And we will also append the ‑‑record is equal to](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=99.76) [true switch to track the rollout status later.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=107.26) [So the image has been updated now. Let's quickly verify that using](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=111.44) [the kubectl describe deployment command. Awesome.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=115.67) [Let's connect to our service using the browser. And as you can see,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=120.84) [we have now version 2 of our application being serviced by](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=123.77) [our deployment, myapp. Alternatively,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=127) [you can also use the kubectl edit deployment command,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=130.15) [specify the deployment name, which, in our case, is deployment/myapp and along](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=133.54) [with our ‑‑record is equal to true to capture the rollout.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=138.96) [This allows us to edit the deployment API resource using the editing tools,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=144.14) [which, in Windows, by default, is set to Notepad. And hence,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=149.16) [you see this Notepad window popping up. Now,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=152.83) [all I need to do is to scroll down to the image section here](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=156.04) [and change the image to manojnair/myapp:v3. That's it. Save](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=160.05) [the Notepad file, and voila, the deployment has been updated. Awesome.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=167.86) [And as usual, let's connect to our service. And as you can see,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=172.81) [we are now presented with the version 3 of our application.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=175.75) [Now, as an exercise,](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=179.09) [I want you to try updating the image with the version 4 of this application](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=180.29) [with any of the two methods that we discussed in this clip.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=185.37) [Make sure you add the ‑‑record is equal to true to keep track of the deployment revisions, which is something that we'll talk about next.](https://app.pluralsight.com/course-player?clipId=2d8cdbc4-e2bf-4862-8adc-4ac5cee57edb&startTime=188.54)

### [Rolling Back the Application to Previous Versions](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f)

[Let's run kubectl rollout history and specify our deployment,](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=2.54) [myapp. As you can see, we see a history of changes made to our](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=6.46) [deployment and the corresponding revision numbers.](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=11.18) [The last change we have made is to set the image to version 4. To](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=15.04) [revert to the previous change, we can use kubectl rollout undo](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=19.66) [deployment/myapp. This will undo our latest change, which, in our](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=24.07) [case, is going to update the image from version v4 and bring it back](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=28.46) [to its previous state, which is version v3.](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=32.52) [Let's verify that by describing a deployment. And](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=36.24) [now, let's connect to our service.](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=41.98) [And surely enough, we can see that our application has](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=44.74) [been reverted back to version 3.](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=47.17) [Now if you run kubectl rollout history command,](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=50.34) [you will see that we no longer have revision 3. And we can see a new revision,](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=53.84) [revision 5, which is basically pointing to the latest change we made,](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=58.58) [which is updating the application to use the v3 image.](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=62.54) [If you wanted to revert to a specific revision number,](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=66.54) [let's say to revision 1, you can use the same command, but add the](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=69.53) [‑‑to‑revision parameter and specify the revision number,](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=73.61) [which, in this case, let's say, is revision 1. As you can see, we have now reverted to version 1 of our application.](https://app.pluralsight.com/course-player?clipId=cd47e792-3989-4a81-8b76-be6b47c5e06f&startTime=77.68)

### [Using the Declarative Approach to Deploy Kubernetes](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d)

[Let's create a new deployment called myapp2 with the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=2.04) [v2 version of our application.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=5.51) [But this time, let's use the declarative approach.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=7.32) [To do so,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=10.29) [we will need to create a YAML file that defines the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=11.75) [Kubernetes deployment object.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=14.79) [We start with the API version,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=17.24) [which defines the version of the Kubernetes API we'll be](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=18.9) [using to create our deployment object.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=21.89) [Next up is the kind that defines the kind of object we want to create.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=24.94) [In our case, that is a deployment.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=28.84) [Metadata, as the name suggests,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=32.14) [is used to provide data that helps us uniquely identify the object,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=33.98) [including a name, which, in our case, we're going to set it as myapp2.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=38.34) [Spec defines the desired state of the Kubernetes object we are defining.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=42.98) [In case of a deployment, this would be the number of replicas of what we need,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=47.53) [the selector, that is used to define what Pods we need to manage as a deployment,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=52.64) [and, of course, the Pod definition itself.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=56.95) [In our case, we need three replicas.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=60.44) [For the selector,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=62.2) [we will match all Pods that are labeled as myapp2 to be](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=63.56) [managed by our deployment object.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=67.61) [And for the Pod definition,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=70.34) [let's specify the template where we provide the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=71.92) [container image as manojnair/myapp:v2.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=74.19) [We're going to use the version 2 of our image and the port as 80.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=78.54) [So now, we have our deployment YAML ready.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=83.04) [But as you already know, we need to expose this deployment as a service,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=85.8) [which can also be done declaratively.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=90.04) [The service object is defined in the v1 apiVersion.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=91.48) [Kind is Service.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=96.12) [And for the metadata, let's define the name as myapp2.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=97.83) [Now, what really changes here is the spec.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=102.26) [Here,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=106.87) [we define the selector and the labels that will be used by the service to](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=107.13) [load balance the Pod. In this case, all Pods that have the label app: myapp2](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=110.74) [will be load balanced by the service we are defining here. We will define the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=116.86) [type as LoadBalancer and specify the target port and the port as we did with](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=122.21) [the kubectl expose command.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=127.09) [Great.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=129.54) [So now we have both the service and the deployment YAML file created.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=130.07) [The good thing about YAML is that we can combine them into a single file, let's](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=134.74) [call it myapp2.yml, and separate our deployment and service objects using three](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=139.41) [dashes. To create a deployment and service, we can use the kubectl create](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=145.8) [command and specify the myapp2.yml file. As you can see, it creates both the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=151.78) [deployment and the service. And to check our deployment status, let's run the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=158.97) [kubectl get deployment command. And now we have 3 out of 3 Pods running for our](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=163) [myapp2 deployment.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=168.29) [Great. To check our service status, let's run kubectl get service, and we](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=170.84) [can see that our myapp2 service has a public IP assigned.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=175.56) [Let's open up a browser and connect to that public IP. Beautiful.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=180.04) [We can see our application is running version 2 of our myapp. And](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=184.25) [if you open up a new tab or an incognito window,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=187.85) [you will see that the machine name changes as our service load](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=190.73) [balances between the three Pods of our deployment.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=193.68) [The good thing about declarative approach is that now you can define your](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=196.74) [Kubernetes objects as YAML files, source control them,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=200.24) [build your objects as a part of the CI/CD pipeline, similar](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=204.1) [to the concept of Infrastructure as Code.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=207.79) [Now,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=210.56) [what if I wanted to scale the number of replicas to 10 or update the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=211.04) [image to use the version 4 of our application? Easy.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=214.84) [Just make those changes in the YAML file and then use the kubectl apply](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=219.14) [command and specify the updated YAML file. That's it.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=223.91) [As you can see,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=228.44) [our deployment has now 10 replicas, and our service now](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=229.2) [resolves to version 4 of our application.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=232.95) [Before we move on,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=237.04) [let's clean up our environment and get rid of the second deployment that](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=238.17) [we created, as well as the service that we created.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=241.77) [Fortunately, that is pretty simple to do so.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=245.04) [All we need is to use the kubectl delete command and](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=247.84) [provide the file name that we used to actually create the](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=251.23) [deployment, as well as the service,](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=253.86) [which, in our case, is myapp2.yml. As you can see, it deletes both the myapp2 deployment and the service.](https://app.pluralsight.com/course-player?clipId=a7795af7-4d49-4b78-bf6c-22bf450ebf8d&startTime=255.61)

### [Pushing the Image to the Azure Container Registry (ACR)](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2)

[We have been using the Docker Hub repository to host our container images.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=2.24) [It would be great if we can host our images in a native Azure service.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=6.54) [Thankfully,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=11.07) [Azure provides a robust registry service called Azure Container Registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=12.13) [Integrating ACR with AKS will give us the best of both worlds.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=17.24) [We cannot only secure our images as they remain private to our environment,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=20.71) [but also take advantage of the managed identity assigned to the](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=24.64) [AKS cluster to pull images of this registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=28.71) [Let's create an Azure Container Registry by clicking on Create a resource,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=31.94) [Containers.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=36.55) [Choose Container Registry, and then click on Create.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=37.29) [Here, we will provide a registry name.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=40.23) [Notice how the complete name of a repo is the name of the](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=43.54) [registry followed by azurecr.io We will choose the same](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=47.02) [location where our AKS cluster is hosted.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=51.98) [For SKU, we will choose Basic.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=54.52) [The higher tier you choose, better will be the performance and the scalability.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=57.04) [Networking blade is pretty much grayed out as we are using the basic SKU.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=61.42) [I highly recommend you use the premium SKU in production as it provides](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=66.84) [a private endpoint for the Azure Container Registry,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=70.34) [and same is also true for encryption as well.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=73.38) [Ignoring the Tags blade, let's run a validation of our inputs.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=76.94) [And once done, let's click on Create.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=80.49) [I will give this a minute as it deploys our container registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=84.14) [Now, we need to give our AKS agent pool or,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=93.84) [in other words,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=97.16) [our Kubernetes worker Nodes the permission to pull](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=97.89) [container images from this registry, which is our Azure Container Registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=100.86) [To do so, let's go to the Access control blade of the resource,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=106.24) [click on Add, and then choose Add role assignment.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=109.74) [For role, we need to only allow our agent pools to pull images off this registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=113.18) [So the reader role is more than sufficient.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=118.32) [Since we're using a system‑assigned manage identity,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=121.94) [all we need to do here is to type our AKS cluster name,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=124.21) [which is aksdemo1, and choose the aksdemo1‑agentpool identity.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=127.5) [Let's click on Save, and that's it.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=134.24) [Our AKS Node pools can now read images off the container registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=136.16) [Right now, our container registry is empty and has no images.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=141.84) [So let's push the v1 image of our myapp application to](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=146.34) [this registry. To do so, first, let's run the docker image](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=149.83) [ls to list our Docker images.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=155.15) [Now, let's tag the v1 image, which is the login server details of](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=157.44) [our ACR, docker tag manojnair/myapp:v1 followed by the login server](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=161.74) [name and the image name and the tag.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=170.06) [Let's confirm if the tagging was successful by running](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=173.64) [the docker image ls command again.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=176.36) [And as you can see, we do have our image tag with the login server name.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=178.61) [Now, we need to push this image to the registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=183.74) [Azure CLI makes this very easy by using the az acr login command.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=187.44) [So az acr login, and I will specify the name of the registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=193.14) [Once our login is successful,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=199.24) [all we need to do here is to use the Docker push command to push the](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=200.92) [tag image to our Azure Container Registry. Awesome.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=204.75) [We can see that our repository is now available in the](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=215.06) [registry, along with the v1 tag.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=218.62) [Now comes the litmus test. Let's now create a deployment. But this](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=221.24) [time, instead of using our regular Docker Hub image,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=225.46) [let's use the Azure Container Registry image.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=228.84) [Remember that this image is not available publicly. And as of](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=232.34) [now, only my Azure user account and the agent pool Nodes can](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=236.23) [pull this image from this registry.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=240.22) [So kubectl create deployment, let's call this myappacr, and the image](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=242.74) [as our ACR login server followed by the image name and the tag. As you](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=247.97) [can see, the deployment has been created.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=253.95) [And to verify the status of the deployment,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=256.13) [let's run the kubectl get deployment myappacr. Now, let's expose the](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=258.37) [deployment using the kubectl expose command followed by the deployment name.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=264.57) [Type as the LoadBalancer. Target port and port set to 80.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=269.14) [Once we get the public IP assigned to our service,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=275.04) [let's connect to it via a browser. And boom, the version 1](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=277.8) [of our application is now being served,](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=281.33) [the image of which is now securely stored in our Azure Container Registry or ACR. Pure awesomeness.](https://app.pluralsight.com/course-player?clipId=f806bac0-1f85-42de-bf81-3368aaf79eb2&startTime=283.69)

### [Module Summary](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58)

[Didn't I say this module is going to be full of](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=2.24) [hopefully interesting demonstrations?](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=4.97) [We covered a lot of ground in this module and saw AKS in action.](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=7.24) [We started the proceedings by reviewing our sample application,](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=11.34) [spun a Docker container based on that application's Docker image.](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=14.87) [Next,](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=18.84) [we created a Kubernetes deployment of our application](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=19.24) [manually using the imperative approach.](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=21.73) [We saw how to scale our application by adding more replicas manually](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=24.34) [and then added Nodes to a worker pools to accommodate for future](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=28.48) [groups, such as adding more Pods or replicas.](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=32.56) [Next,](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=35.74) [we used the set image deployment and the kubectl edit commands to update the](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=36.17) [image used by our application and then used the Kubernetes rollback command](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=40.73) [to roll back changes made to our deployments.](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=45.18) [Ask any DevOps engineer how awesome this feature is, and I'm](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=48.24) [sure she will nod her head in agreement.](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=52.18) [Finally,](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=55.64) [I gave you a glimpse of how you can use the declarative](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=56.24) [approach to create Kubernetes objects, which can be](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=59.28) [integrated into your DevOps pipelines. Let's now move to the final module of this course.](https://app.pluralsight.com/course-player?clipId=d61c3aa0-55ac-49da-81b8-e1eb98226e58&startTime=62.24)

## [Next Steps](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d)

### [Next Steps](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d)

[Congratulations!](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=2.04) [You have made it.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=3.26) [Well done.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=4.43) [As always, thank you so much for your time,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=5.52) [and I hope I was able to get you excited about both Kubernetes,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=8.23) [as well as AKS. I'm sure you must be excited to dive a bit deeper in AKS,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=12) [so I wanted to leave you with some additional references and features you](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=17.5) [might be interested in to explore on your own.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=21.1) [AKS will provide you with a Kubernetes farm, but you need to have a good](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=24.94) [handle on Kubernetes. Thankfully, the Pluralsight course library has](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=28.72) [crafted some awesome learning paths on Kubernetes. Start with the](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=33.36) [Certified Kubernetes Application Developer path,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=37.78) [even if you're not interested in the CKAD certification. This](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=40.19) [path will go a bit deeper into the concepts we touched upon in](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=44.05) [this course and will cover topics like Pod health, understanding](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=47.03) [storage options in Kubernetes, especially around persistent volumes,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=50.78) [persistent volume claims, and also managing secrets and](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=54.13) [configuration using secrets and config maps in Kubernetes.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=57.59) [Once you get a good handle on Kubernetes,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=61.94) [check out some other courses in the Pluralsight](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=64.04) [library on the Azure Kubernetes Service.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=66.11) [I do highly recommend watching Mike's,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=68.73) [Anthony's, and James's courses on this topic.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=70.89) [They are awesome.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=73.37) [Finally,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=74.74) [take a look at the Azure Kubernetes Service workshop](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=75.66) [on the Microsoft Learn portal.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=78.33) [This workshop will help you deploy a multi‑container](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=80.34) [application to AKS, including setting up SSL and TLS using](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=82.87) [ingress controllers with App Gateway.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=87.4) [Well,](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=89.94) [I reckon that's about it. Feel free to reach out to me on Twitter](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=90.31) [or on LinkedIn, and let me know how you found the course and how](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=94) [I can improve my future courses.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=97.47) [I hope you continue on the journey on exploring the awesomeness](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=100.04) [of Azure Kubernetes Service. On that note, keep calm and az aks.](https://app.pluralsight.com/course-player?clipId=f2ba3d4f-deed-4342-b77d-2a1adde7338d&startTime=103.28)